FACTORS AFFECTING THE INCOME VELOCITY OF MONEY IN THE COMMONWEALTH CARIBBEAN

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There are many issues related to the demand for money function which remain far from settled. Changes in the financial and social environment in recent years have put the performance of money demand equations either in single form or as part of macro-economic models under increasing scrutiny. Problems in identifying the function continues to be a major scourge.[1] Poor forecasting ability of the equations has also reduced their importance for monetary policy purposes. Though one cannot separate the demand for money functions from velocity functions (i.e. the average rate of turnover of the money stock), the concept of velocity has long warranted attention in its own right. In fact the kind of assumptions one makes with respect to the behaviour of velocity often constitute the major difference in the approach to the study of money demand.

In the industrial countries the increasing blurring of the distinction between money and near monies may be one of the major factors underlying the stability issue. In a developing country context velocity may be affected not only by technical innovations, but by the expansion of the financial sector, the monetisation of the economy, the growth of income among other things. Our purpose in this paper is to identify some of the determinants of velocity in the Commonwealth Caribbean over the last two decades. The focus is on four countries, viz. Barbados, Guyana, Jamaica and

Trinidad and Tobago. The Paper is divided into four parts. In the first part we discuss the concept of velocity. The second speculates on some of the major factors that may influence the behaviour of velocity. The third section examines the trends in income velocity in the Commonwealth Caribbean and with the aid of the regression technique identifies the main influences on the behaviour of velocity. Part four contains some concluding comments.

The Concept of Velocity

Essentially monetary velocity is a measure of the rate of use of money. Defined as the average number of transactions made with each unit of money, it is obviously a flow concept which though not visible is measurable. Put differently, the velocity of money is the ratio of total spending to the money stock, or the inverse of the money income ratio. Depending on how one defines total spending (the numerator), or the money stock (the denominator), there can be any number of velocity series. In Irving Fisher's original equation 'MV = PT' (Eq. 1), 'M' represented the money stock, 'V' the velocity of circulation, 'P' the price level and 'T' the number of transactions (final and non final). Since 'MV' and 'PT' are really two ways of viewing the same transaction, i.e. total expenditure of the buyers is always equal to total receipts of the sellers, the equation is an identity. 'T', of course, could be replaced by a variable 'Y' representing only final transactions so that the identity could be written as:

(Eq. 2) MV = PX where X represents some version of real income or output, and 'P' the average level of prices. 'Y' can be used in place of 'PX' to represent nominal GDP or GNP, so that Equation (2) becomes

(Eq. 3) $MV = Y$

The Cambridge economists sought to put the emphasis on cash balance holdings used to facilitate expenditures and modified the identity to read

(Eq. 4) $M = kY$

where $k = \frac{1}{V}$ and stands for average cash balances as a fraction of nominal income. By doing this they shifted attention to the determinants of the demand for money rather than the effects of changes in the supply of money. While the equation of exchange relates the money flow during a period to the commodity flow during the same period, the Cambridge equation relates average cash balances during a period to the level of income in the same period.[2]

Besides the income concept of velocity discussed above, velocity can also be measured in terms of demand deposits turnover which is debits (check payments) demanded divided by demand deposits.

The pre-1930s version of the quantity theory regarded 'V' and 'Y' as parametric constants, at least in the short term. Adherents including Fisher, assumed that the potential output of the economy was not affected by changes in the supply of money. Output was more dependent on the availability and productivity of land, labour and capital (physical capacity and the technology of production). Constancy in velocity was argued on the grounds that 'economic and social relations' (e.g. density of population, commercial customs, transport, technical conditions, etc.) which affect the rate of turnover do not change in the short term. It was felt that velocity was not affected by the quantity of money. With 'V' and 'Y' constant, a direct relationship was seen to exist between the quantity of money and the level of prices. In its more rigid version changes in the price level was directly proportional to changes in the money stock.

Keynes rejected the idea that spending units tend to hold a constant fraction of their incomes in cash balances. He contended that the demand for money was a far more complex phenomenon, and identified three distinct motives (transactions,

precautionary and speculative) why people would want to hold money. The medium of exchange role was not the only function of money. Liquidity preference could be influenced by yields on alternative financial assets. Once this was admitted there need not be a fixed relationship between the money stock and the level of expenditure. Velocity could change in response to expectation of future interest rates movements and perceptions of risk. Changes in the money stock itself could affect velocity through their effects on interest rates. For these reasons Keynes rejected the idea that prices necessarily change by the same proportion as the change in the money supply, or that increased expenditures impact directly on prices. With idle resources, increased demand may lead to an increase in output.

The increasing range of alternative assets has led to the formulation of more sophisticated models of cash management in which the transactions demand for cash is associated with a high interest sensitivity. The presence of interest earning assets provides an incentive to economize on cash. Some writers [3] see the transactions demand for money in terms of inventory theory in which the problem is to minimize the costs of acquiring and holding cash. One implication of this theory point to the view that the demand for money may increase less than proportionately to the level of income i.e. velocity would increase as income increases.

The modern quantity theorists build on both the inventory approach and Keynes' portfolio insights. They emphasise the role of money in explaining short-run fluctuations in nominal income and movements in the general level of prices. Velocity is not regarded as an institutionally determined constant. In terms of the equations of exchange a change in the money stock could affect any of the other variables. Quantity theorists, however, have for long argued that the demand for money is one of the most stable relationship in economics - a view that has come under increasing

challenge in recent years, as indicated earlier. For policy purposes the issue is not about the constancy or even the stability of velocity, but how predictable it is.

Factors Affecting the Income Velocity of Money

Earlier we defined income velocity as:

$$V = \frac{Y}{M}$$

where V = income velocity of circulation

Y = nominal income or output

M = the money stock

It is clear from this definition that any factor that affects 'M' relative to 'Y', and vice versa, can cause V to change. The aggregate position of course reflects the behaviour of individuals and firms. Factors that induce economic units to hold less money tend to increase velocity, while factors which encourage greater money balances tend to reduce it. An any point in time there can be counteracting forces whose net effect can leave the velocity unchanged. Also, different components of money could experience different velocity.

While economists agree that income (either per capita income or total national income) is one of the most important variables affecting movements in velocity, they do not all share the same view on the nature of the relationship between velocity and income. Friedman, for example, argues that there is a negative relationship between income and velocity. He contends that over long periods the public increases its money holdings faster than income as incomes rise, leading to a fall in velocity.[4] In terms of the Cambridge equation 'k' rises as incomes rise. Friedman has called this the 'luxury good' effect. This contention is supported by the findings of a number of

other researchers[5] and is partly derived from the argument that in the early stages of development monetary expansion normally takes place at a faster rate than money income. This would follow if the income elasticity of the demand for money is greater than one.[6] By the same token at a later stage with greater monetisation of the economy and a more sophisticated financial sector velocity should increase. It is worth noting that velocity may not be the same in all sectors of the economy and the trend in one sector could be offset by trends in the other sectors.[7] It is also reasonable to expect velocity to behave differently in the different stages of development. The idea of an income elasticity of velocity greater than one is not shared by all. There is an argument that there are economies of scale in the holding of cash and this leads to an elasticity of less than one, i.e. an increasing income velocity.[8]

A number of studies have shown that the rate of interest is closely related to the velocity of money. In the early stages of development, the opportunities for investment tend to be few. As development proceeds, however, a wider range of financial assets offering varying degrees of returns and liquidity allow wealth holders a greater measure of portfolio diversification. Interest rates represent the opportunity cost of holding money, and the higher the rates the more likely will spending units economize on cash. Velocity is expected to be a positive function of the rate of interest.[9]

The expected rate of inflation is another variable that can affect velocity. The direct effect of inflation is to reduce real cash balances and this should lead to increased demand for money for transaction purposes. High expected rates of inflation on the other hand will encourage economic units to economize on money holdings, thus leading to an increase in velocity. An expected increase in prices will induce the holding of real goods as opposed to financial assets and vice versa. The

net effect of these various forces may have a negligible effect on velocity. One suspects, however, that in a situation where inflation persists for any length of time the desire to avoid a real loss of income may far outweigh the need to maintain real cash balances. In other words, inflation encourages the economizing of cash and this should lead to an increase in velocity.

Movements in the exchange rate can also affect velocity. This can be indirect through its impact on inflation. In a situation where confidence in the domestic and/or external value of the local currency is waning residents may seek to substitute foreign currency for local money. In circumstances where the inflation rate moves closely with the exchange rate, it can be difficult to capture separately the effect of these two variables on velocity.

Changes in the financial environment, both in developed and developing economies, can also be expected to exert an influence on velocity. The behaviour of economic units can be affected by changes in financial regulations, a wider range of financial institutions and assets, the spread of bank offices, the introduction of deposit insurance and credit cards, new techniques of cash management, etc. The psychological impact of these factors may be difficult to operationalise in a single variable. A common approach is to use the deposit/currency ratio as an index of financial development or 'financial sophistication'. This variable should have a positive effect on velocity.

The Commonwealth Caribbean Experience

In Table 1 we present two series of the income velocity of money for each of the four countries for the period covering roughly the last two decades. As the footnotes to the Table show, 'V1' is based on the narrow concept of the money supply, while V2 is based on a broad definition. With respect to both V1 and V2, Trinidad and Tobago

TABLE 1

The Income Velocity of Money, 1969-1990

Year	Trinidad & Tobago		Jamaica		Guyana		Barbados	
	Y1	Y2	Y1	Y2	Y1	Y2	Y1	Y2
1969	11.60	4.00	9.49	3.54	8.99	3.43	n.a.	n.a.
70	10.86	3.48	9.13	3.10	9.27	3.23	n.a.	n.a.
71	9.97	3.08	8.50	2.77	8.92	3.16	n.a.	n.a.
72	9.62	2.95	8.09	2.60	8.07	2.79	5.27	1.55
73	10.66	3.08	8.09	2.73	7.44	2.56	6.15	1.64
74	14.60	4.13	9.73	3.34	8.56	3.24	8.31	2.12
75	12.70	3.90	9.32	2.92	7.67	3.12	7.46	2.04
76	9.79	3.32	9.12	2.74	5.83	2.46	7.57	2.02
77	9.52	3.28	6.94	2.59	4.84	2.13	7.69	2.07
78	7.98	2.89	8.32	3.02	4.52	1.98	6.91	2.02
79	8.17	2.93	9.06	3.04	4.94	1.94	6.00	2.05
80	8.88	3.27	8.35	2.72	5.41	1.96	7.08	2.22
81	10.62	3.29	8.94	3.16	5.39	1.77	7.16	2.13
82	9.42	2.91	8.36	2.70	3.98	1.30	7.60	2.09
83	8.19	2.45	9.23	2.59	3.26	1.05	7.23	2.09
84	8.71	2.27	10.72	2.94	3.29	1.03	7.50	2.08
85	9.04	2.14	10.66	2.85	3.20	1.02	7.34	2.03
86	9.27	2.12	9.27	2.68	2.72	0.91	6.58	2.07
87	10.00	2.10	8.65	2.63	3.09	1.09	6.58	2.07
88	10.95	2.07	7.89	2.45	3.01	1.08	5.83	1.93
89	11.18	2.12	8.79	2.48	3.34	1.26	6.22	1.96
90p	11.36	2.30	10.08	2.79	n.a.	n.a.	6.34	1.88

p. provisional

n.a. not available

Y1 = the ratio of GDP (at current market prices) to M1 (currency in circulation plus bank demand deposits)

Y2 = the ratio of GDP (at current market prices) to M2 (M1 plus bank savings and time deposits).

The annual money stock is taken to be the average of the end of quarter figures.

Source: Computed from official publications and IMF, **International Financial Statistics**, Various Issues.

experienced the highest average velocity with Jamaica in second place. With respect to VI, the figure for Barbados was higher than of Guyana, but for V2, the ratio was almost the same. The differences in terms of country experience tend to be more pronounced in VI than in V2.

As far as trends are concerned, the V1 series for Trinidad and Tobago shows no clear trend. In the case of V2, however, the ratio appears to have declined since the early 1980s. With respect to Jamaica there appears to be no clear trend either in V1 or V2. In the case of Guyana, both the V1 and V2 ratios fell in the 1980s from the levels prevailing in the 1970s. In Barbados V1 fluctuated from year with no clear trend, but there appeared to be a slight decline in the V2 values towards the end of the 1980s.

In order to gain a better insight into the variability in V1 and V2 the coefficient of variation was computed and the results are shown in Table 2. With respect to both versions, Jamaica had the lowest coefficients and Guyana the highest. Trinidad and Tobago and Barbados were between these two extremes, but there was greater variation in Trinidad and Tobago than in Barbados in respect of both V1 and V2.

The secular trends can more easily be guaged from the linear equations presented in Tables 3(a) and 3(b) which show that results of velocity regressed on time. With respect to V1, only in Guyana does the velocity show any clear trend, and this is a declining one. With respect to V2 the time coefficient for Guyana is similarly associated with a negative sign, is the case for Jamaica and Trinidad. In the latter two cases however, the coefficient of determination is smaller, with the Trinidad parameters displaying a stronger relationship.

TABLE 2

The Average Income Velocity of Money and the Associated *Coefficients of Variation*

Countries	Period	Mean		Coefficient of Variation	
		V1	V2	V1 %	V2 %
Trinidad & Tobago	1969-1990	10.14	2.91	15.53	22.25
Guyana	1969-1990	5.51	2.02	41.80	43.65
Jamaica	1969-1990	8.94	2.84	9.97	9.72
Barbados	1972-1990	6.88	2.00	11.24	8.26

Source: Computed from Table 1.

TABLE 3(a)

V1 Regressed on Time (t)

Country	Period	Constant Term	Time (t)	$\bar{R}^2$	D.W.
Barbados	1972-90	1.950	-0.003 (0.005)	0.02	0.96
Guyana	1969-89	9.017	-0.350 (0.028)	0.89	0.83
Jamaica	1969-90	8.639	0.029 (0.030)	0.04	1.27
Trinidad & Tobago	1969-90	10.702	-0.054 (0.053)	0.05	0.83

TABLE 3(b)

V2 Regressed on Time (t)

Country	Period	Constant Term	Time (t)	$\bar{R}^2$	D.W.
Barbados	1972-90	1.934	0.007 (0.007)	0.07	0.72
Guyana	1969-89	3.369	-0.134 (0.011)	0.89	0.86
Jamaica	1969-90	3.065	-0.022 (0.008)	0.27	1.64
Trinidad & Tobago	1969-90	3.784	-0.083 (0.012)	0.69	0.93

In order to explore the effects of particular factors on velocity, we ran regressions using a double log function to demonstrate the relationship in terms of elasticity. The following symbols were used.

V1 = the income velocity of money based on the narrow money stock concept defined as currency in circulation plus demand deposits (MI). The annual money stock was taken as an average of end of quarter balances.

V2 = the income velocity of money computed on the basis of broad money (MI plus bank savings and time deposits).

PI = per capita real GDP

NDC = the ratio of demand deposits to currency in circulation

BDC = the ratio of total bank deposits to currency in circulation

SR = the nominal interest rate on savings deposits

FR = the interest rate on three months fixed deposits

INF = the expected rate of inflation. The inflation rate of the preceding year was used as a proxy.

All equations are corrected for serial correlation with the Cochrane-Orcutt method. The figures in parenthesis are standard errors. The $\bar{R}^2$ values reflect adjustment.

Barbados (1973-90)

V1 was regressed on real per capita income, the expected rate of inflation, the interest rate on ordinary savings deposits, the expected rate of inflation and the ratio of demand deposits to currency in circulation. The OLS result is given in Eq.(5). While

Eq. (5) $$\ln V1 = \underset{(2.87)}{6.81} - \underset{(0.37)}{0.58 \ln P1} - \underset{(0.03)}{0.03 \ln INF}$$

$$+ \underset{(0.9)}{0.08 \ln SR} - \underset{(0.20)}{0.42 \ln NDC}$$

$\bar{R}^2$ = 0.65
D.W. = 2.32
F = 7.25

the selected variables explain 65 per cent of the variation in V1, only the demand deposit/currency ratio appears to be significant. The coefficient of the per capita income variable indicates an income elasticity of velocity of less than one. The negative sign signifies an inverse relationship with velocity. The inflation variable in this instance has a positive sign, as is the case with the demand deposit/currency variable. The positive sign associated with the savings rate variable point in the expected direction. The ordinary savings rate proved to be a better variable in terms of its impact on the $\bar{R}^2$ than the three-month fixed deposit rate which also came out with a high standard error when it was tried. An experiment with the use of the total bank deposit/currency ratio showed it to be inferior to its narrow version. In Eq.(6) V2 is the dependent variable. In this instance though the $\bar{R}^2$ was only 28 per cent all the variables were significant. The elasticity of income velocity was still less than one, but the income sign in this equation was positive, meaning that broad velocity increases with per capita real income. The inflation variable continued to be associated with a positive sign, but the interest rate came out with a negative one. The demand deposit/currency ratio again came out with the negative sign. The use of the broad 'V' version increased the $\bar{R}^2$ slightly, but there was a marked increase in the value of the D.W. statistic. The substitution of the broad deposit currency ratio for the narrow version also proved to be an 'inferior' variable.

EQ. (6) $\ln V2 = -4.48 + 0.68 \ln PI + 0.08 \ln INF - 0.18 \ln SR - 0.34 \ln NDC$
(0.68) (0.14) (0.02) (0.05) (0.10)

$\bar{R}^2 = 0.28$
D.W. = 2.0
F = 2.30

Guyana (1970-89)

The regression results for Guyana with VI as the dependent variable are shown in Eq.(7). The four variables used there explain 95% of the variation in V1. The dominant variable, however, is per capita income which had a positive sign and showed an elasticity of almost two. The interest rate variable had the expected sign, while the inflation variable came out with a negative one. The latter, however, was associated with a high standard error. Assuming that the published figures on inflation did not truly reflect the actual situation, a run was made with the exchange rate. This, too, was associated with a high standard error and did not improve the fit.

Eq. (7) $\ln V1 = -12.84 + 1.90 \ln PI + 0.20 \ln SR - 0.002 \ln INF - 0.16 \ln NDC$
(4.20) (0.59) (0.10) (0.034) (0.23)

$\bar{R}^2 = 0.95$
D.W. = 1.60
F = 52.97

Equation (8) shows the regression results with V2 as the dependent variable.

Equation (8) shows the regression results with V2 as the dependent variable. This equation depicts V2 as a positive function of all the variables This size of the standard errors associated with inflation and the demand deposit/currency variables raises doubt about their significance.

Eq. (8) $\ln V2 = -15.49 + 2.13 \ln PI + 0.01 \ln INF + 0.20 IN SR + 0.03 \ln NDC$
(3.72) (0.53) (0.03) (0.09) (0.20)

$\bar{R}^2 = 0.96$
D.W. = 2.04
F = 85.60

Jamaica (1970-90)

In the case of Jamaica the regression was run with the same four independent variables that were used in investigating the experiences of Barbados and Guyana. In terms of the size of the standard error and its impact on the $\bar{R}^2$, however, the three months-fixed deposit rate was found to be a superior variable to the ordinary savings rate. The results are presented in Equations (9) and (10).

Eq. (9) $\ln V1 = -1.31 + 0.44 \ln PI + 0.11 \ln INF + 0.15 \ln FR - 0.39 \ln NDC$
(2.54) (0.35) (0.03) (0.09) (0.23)

$\bar{R}^2 = 0.46$
D.W. = 1.92
F = 4.43

The combined explanatory power of the four variables was less, than 50%. The

income variable had the largest coefficient but it was still below one. The positive sign indicated that velocity increased with income, again contradicting the Friedman hypothesis,.but supporting the implicit inventory theory position. The inflation and interest rate variables both came out with positive signs. The unexpected negative sign associated with the demand deposit/currency ratio was changed when the total bank deposit/currency ratio was used, but the $\bar{R}^2$ remained the same. The use of the exchange rate as an additional explanatory variable did not improve the fit.

Equation (10) presents the results with V2 as the dependent variable. The fit is not a particularly good one. Not only is the $\bar{R}^2$ low, but only the inflation variable appeared to be significant. The use of the total bank deposit/currency ratio in place of the narrow version increased the $\bar{R}^2$ slightly, but it came out with a negative sign and a high standard error. There was, however, an improvement in the D.W. Statistic. The results are given in Equation (11).

Eq. (10) $\ln V2 = -1.66 + 0.32 \ln PI + 0.08 \ln INF + -0.07 \ln FR + 0.26 \ln NDC$

(1.72) (0.23) (0.03) (0.08) (0.24)

$\bar{R}^2 = 0.27$

D.W. = 2.30

F = 2.50

Eq. (11) $\ln V2 = -1.29 + 0.40 \ln PI + 0.09 \ln INF + 0.06 \ln FR - 0.43 \ln BDC$

(2.34) (0.29) (0.03) (0.07) (0.36)

$\bar{R}^2 = 0.31$

D.W. = 2.09

F = 2.76

Trinidad and Tobago (1970-90)

Equation (12) shows the result of the first run of the equation for Trinidad and Tobago with V1 as the dependent variable and per capita real income, the expected inflation rate, the savings rate and the demand deposit/currency ratio as the independent variables. Unlike the situation for the three previous cases income velocity (the narrow version) is a negative function of per capita income `a la Friedman. The sign of the demand deposit/currency ratio is not only negative, but standard error is unacceptably high. The substitution of this variable by its broader version did not improve the fit of the equation, but the sign became positive. The standard errors of the other variables increased. The use of the number of bank offices did not enhance the fit. The substitution of the three month fixed deposit rate for the ordinary savings rate also did not improve the fit.

$$\text{Eq. (12)}\quad \ln V1 = \underset{(2.90)}{8.61} - \underset{(0.31)}{0.71}\ln PI + \underset{(0.06)}{0.14}\ln INF + \underset{(0.25)}{0.26}\ln SR - \underset{(0.17)}{0.12}\ln NDC$$

$$\bar{R}^2 = 0.44$$
$$D.W. = 1.80$$
$$F = 4.08$$

Equation (13) shows the results with V2 as the dependent variable. The savings rate not only did not have the expected sign, but the standard error was unacceptably high. The use of the three-month fixed deposit rate as a replacement also came out with a negative sign, and was significant, but the $\bar{R}^2$ dropped considerably and the standard error of the income variable increased. In an effort to improve the equation further the demand deposit/currency ratio was substituted for the total bank deposit/currency ratio, but the effect of this move was to raise the standard errors of the other variables. When both the interest rate and the deposit/currency

variables were dropped the $\bar{R}^2$ remained high as can be seen in Eq. (14).

Eq.(13) $\ln V2 = 9.05 + 0.83 \ln PI + 0.09 \ln INF - 0.10 \ln SR + 0.76 \ln BDC$
(4.78) (0.44) (0.05) (0.20) (0.44)

$\bar{R}^2 = 0.82$
D.W. = 2.43
F = 19.97

Eq. (14) $\ln V2 = -4.45 + 0.53 \ln PI + 0.10 \ln INF$
(4.10) (0.43) (0.05)

$\bar{R}^2 = 0.81$
D.W. = 2.07
F = 30.21

Concluding Observations

In the Commonwealth Caribbean the income variable appears to be the most important one affecting velocity, both in its narrow and broad versions. The value of the coefficient was highest in Guyana, where the sign was positive in both the V1 and V2 equations. The decline in this country's velocity in recent years (which is one way of saying that the money stock grew faster than nominal income) coincides with a significant drop in per capita income. In Trinidad and Tobago the decline of V2 in the 1980s also coincided with a fall in income. No trend, however, could be discerned in V1. In the case of Barbados, the income variable was negatively related to V1, but moved in the same direction with V2. In Jamaica both V1 and V2 seemed to have remained fairly stable in the face of a decline in per capita income since the early 1970s.

While the paper has raised a number of issues about the behaviour of velocity in the Commonwealth Caribbean, it is difficult to draw definitive conclusions. If one

assumes as Friedman does, that the public increases its money holdings as incomes rise, does it follow that with a fall in incomes such holdings decline at a faster rate? In other words does velocity increase with a fall in incomes? Friedman says little about the rate of change of velocity. The reasonable explanation for the widely divergent relationship between income and velocity in the empirical studies is that velocity could be expected to behave differently in the various stages of development. Per capita income by itself is not sufficient to capture economic and financial development. The situation is complicated in a small sample where per capita income changes direction in the same series, without necessarily implying anything about the stage of development.

The use of the deposit/currency ratio as a proxy for financial development or sophistication was not satisfactory. In Barbados there was no clear trend in either the narrowly or broadly defined ratios. As Table 4 shows currency growth was almost the same as that of demand deposits and greater than total bank deposits. In the case of Guyana, the currency increase over the period was a little below demand deposit but exceeded total deposits. In Jamaica, currency growth exceeded that of both demand deposits and total deposits respectively. In Trinidad and Tobago the currency increase was greater than that of demand deposits, but below that of total deposits. Clearly, if one were to take an increase in the deposit/currency ratio as an indicator of financial development, it would be difficult to guage the extent to which this has taken place.

Even though we used a short rate in the Paper, the relationship between interest rates and velocity is not clear cut. We assumed that the relevant rate was the nominal rate (money illusion), and this may in fact not be the case. The impact of inflation, too, on velocity can be ambiguous, since short term reactions may not be the same as in the long term.

TABLE 4

Percentage Increase in Currency and Bank Deposits over Selected Periods

	Period	% Change in Currency [1]	% Change in Demand Deposits	% Change in Total Deposits
Barbados	1973-90	625	622	541
Guyana	1970-89	3,475	3,525	3,150
Jamaica	1970-90	3,479	2,115	2,760
Trinidad & Tobago	1970-90	1,206	1,054	1,888

1. in circulation

Note: the annual figure is taken as an average of end of quarter balances.

Source: Computed from official publications.

FOOTNOTES

1. See T.F. Cooley and S.F. Le Roy, "Identification and Estimation of Money Demand", **American Economic Review**, Vol. 71 (Dec. 1981).

2. See H. Visser, **The Quantity of Money**, Martin Robinson, London, 1974, p. 55.

3. In particular see W.J. Baumol, 'The Transactions Demand for Cash; An Inventory Theoretic Approach", **Quarterly Journal of Economics**, Vol. 66, No. 4, (1952), See also J.Tobin, "The Interest-Elasticity of Transactions Demand for Cash", **Review of Economics and Statistics**, Vol. 38, No. 3, (1956).

4. See M. Friedman, "The Demand for Money: Some Theoretical and Empirical Results", **The Journal of political Economy**, Vol. LXVII (1959).

5. For example, see R.T. Selden, "The Monetary Velocity in the United States" in **Studies in the Quarterly Theory of Money**, ed. by M. Friedman, Chicago, University of Chicago, 1956. In a cross section study Ezekiel and Adekunle also found that velocity levels tended to decline with higher per capita income countries. See N. Ezekiel and J.O. Adekunle, "The Secular Behaviour of Income Velocity: An International Cross-Section Study", **IMF Staff Papers**, Vol. XVII, No. 2.

6. See P.J. Drake, **Money, Finance and Development**, Martin Robertson, Oxford, 1980, p. 98.

7. Ibid.

8. See Ezekeil and Adekunle, op. cit. See also Baumol and Tobin, op. cit.

9. See D. Laidler, "The rate of Interest and the Demand for Money - Some Empirical Evidence", **Journal of Political Economy**, Vol. 74, Dec. 1966.